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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/963,307	12/09/2015	Douglas R. Jungwirth	15-0281-US-NP 800-124	1025
107112	7590	09/24/2020	EXAMINER	
The Small Patent Law Group LLC 225 S. Meramec, Suite 725 St. Louis, MO 63105			BOLDA, ERIC L	
			ART UNIT	PAPER NUMBER
			3645	
			NOTIFICATION DATE	DELIVERY MODE
			09/24/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DOUGLAS R. JUNGWIRTH

Appeal 2020-000789
Application 14/963,307
Technology Center 3600

Before STEFAN STAICOVICI, MICHAEL L. HOELTER, and
WILLIAM A. CAPP, *Administrative Patent Judges*.

HOELTER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1, 2, 4–16, and 18–24, which constitute all the claims pending in this application. *See* Appeal Br. 4. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM the Examiner's rejections of these claims.

¹ We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as "The Boeing Company." Appeal Br. 4.

CLAIMED SUBJECT MATTER

The disclosed subject matter relates “to systems and methods of imaging long range targets, such as Light Detection and Ranging (LIDAR) systems and methods.” Spec. ¶ 1. Claims 1, 15, and 24 are independent. Claim 1 is illustrative of the claims on appeal and is reproduced below.

1. An imaging system configured to form images of a target based on a plurality of reflected light signals, the imaging system comprising:

a light transmission assembly configured to transmit a plurality of light signals towards the target, wherein each of the plurality of light signals has a unique characteristic that differs from the other of the plurality of light signals; and

a light detector assembly configured to receive and detect the plurality of light signals reflected from the target and distinguish each of the plurality of light signals based on the unique characteristic of each of the plurality of light signals.

EVIDENCE

Name	Reference	Date
Feldkhun et al. (“Feldkhun”)	US 2010/0008588 A1	Jan. 14, 2010
Cable et al. (“Cable”)	US 2014/0028997 A1	Jan 30, 2014

REJECTIONS

Claims 1, 2, 4–12, 14–16, 18–21, 23, and 24 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by Feldkhun.

Claims 13 and 22 are rejected under 35 U.S.C. § 103 as unpatentable over Feldkhun and Cable.

ANALYSIS

*The rejection of claims 1, 2, 4–12, 14–16, 18–21, 23, and 24
as anticipated by Feldkhun*

Appellant presents arguments for claims 1, 4, 5, 15, 17, and 24. *See* Appeal Br. 10–21. However, the arguments for claims 15, 17, and 24 replicate those already presented with respect to the limitations of claims 1, 4, and 5. *Compare* Appeal Br. 10–14 with Appeal Br. 14–21. We select claims 1, 4, and 5 for review, with the remaining claims (i.e., claims 2, 6–12, 14–16, 18–21, 23, and 24) standing or falling with their respective claim. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Claim 1

Claim 1 recites a transmitting assembly that transmits a plurality of light signals, each having a unique characteristic, towards a target. Claim 1 further recites a detector assembly that receives the reflection of these light signals from the target, and which can distinguish the received light signals based on the unique characteristics of these light signals. The Examiner relies on Feldkhun for disclosing these limitations. *See* Final Act. 3 (referencing Feldkhun Fig. 2 (and specifically items 201, 202, 204, 213 and 218), ¶ 45).

Regarding the limitation of each light signal being unique, the Examiner references paragraph 45 of Feldkhun which discusses illumination “with multiple patterns **206** having different spectra” and the use of filters “to produce first radiations **210** that may have different spectra.” *See also* Feldkhun ¶ 46 (using filters “in each channel to produce a first radiation with a spectrum that is distinct from other channels”). *See* Final Act. 3.

Appellant does not dispute these teachings identified by the Examiner above (*see* Appeal Br. 10–12) and further acknowledges that “in Feldkhun,

an object is **illuminated**.” Appeal Br. 10; *see also* Feldkhun Fig. 2. However, according to Appellant, Feldkhun’s illumination of the object “causes the object to generate its own **radiation**” rather than be reflected back from the object. Appeal Br. 10. To be clear, as per Appellant, “in Feldkhun, the initially transmitted light from the source[] is **not** reflected, detected, and distinguished, as recited in claim 1.” Appeal Br. 10; *see also id.* at 11, 12; Reply Br. 3. “Instead, unique object **radiation**, as **caused by the illumination** of the object is detected.”² Appeal Br. 10 (referencing Feldkhun ¶¶ 45, 54). Regarding Figure 2 of Feldkhun, Appellant contends, “[n]otably, the detected object radiations 213 and 214 are not the same as the illuminations 229.” Appeal Br. 11. As support, Appellant provides a dictionary definition of “reflection” (referencing “Merriam-Webster's Collegiate Dictionary, Tenth Edition at page 960”) contending that the Examiner “attempts to conflate ‘radiation’ with ‘reflection.’” Appeal Br. 11 (“[a]n object that radiates light does not merely reflect light”); *see also* Reply Br. 3.

To be clear, paragraph 45 of Feldkhun states, “[o]bject radiations **213** and **214** from a location **205** on the object **204** *in response to the illumination 229* may be detected using one or more multiple-channel imaging systems such as **202** and **203**.” Emphasis added. From this disclosure, it would appear that the detected radiation 213, occurring “in response to” the object being illuminated, may encompass either a reflection

² Appellant further states, “the illumination of the object causes the object to generate its own radiation.” Reply Br. 2–3. “As an example, a phosphorescent object may be illuminated by light and emit distinct glowing light energy that is not a reflection of the light used to illuminate the phosphorescent object.” Reply Br. 3.

of that illuminating signal (Examiner) or it may encompass a uniquely new radiation caused by that object being illuminated (Appellant). Feldkhun anticipated both likelihoods and addressed the matter in paragraph 71 (referenced by both parties, *see* Appeal Br. 11, Final Act. 2, Ans. 7). Paragraph 71 states (referencing the Figure 5 embodiment, but equally applicable to the Figure 2 embodiment), “[r]adiation **529** from the location **521** on the object may be scattered, *reflected*, transmitted, *fluoresced*, or otherwise generated by the object in response to the illumination.”

Emphasis added.

In view of this express disclosure in Feldkhun that the detected or returned radiation may be a *reflection*, Appellant is not persuasive that the Examiner incorrectly relied on Feldkhun for disclosing the occurrence of this phenomena (i.e., reflection) upon the illumination of an object. Although Appellant’s contentions above to the effect that upon illumination, Feldkhun teaches that the object is “fluoresced” (thereby generating a new radiation) is also not incorrect, but this contention by Appellant does not detract from Feldkhun’s equal disclosure of a reflection of the illumination as relied upon by the Examiner. *See* Ans. 7. Accordingly, Appellant is not persuasive that the Examiner erred in relying on Feldkhun as anticipating the limitations of claim 1.

Claim 4

Claim 4 depends directly from claim 1 and further recites that the transmission of each light signal occurs “before” any such signal is subsequently received and detected. On this point, the Examiner addresses the *simultaneous* transmission of the different signals in Feldkhun. *See* Final Act. 4, Ans. 8 (referencing Feldkhun ¶ 79); *see also* Feldkhun ¶ 39 and

Fig. 2. Appellant contends that this transmission-before-detection limitation is not taught in Feldkhun and that “the Office Action has wholly failed to point to anything in Feldkhun that expressly or necessarily describes, teaches, or suggests the limitations of claim 4.” Appeal Br. 13; *see also* Reply Br. 4.

Paragraph 79 of Feldkhun states, “[f]urthermore, the patterns may be projected sequentially and/or simultaneously, and may have different spectra and/or polarizations.” *See also* Feldkhun ¶ 39 (“by activating multiple radiation sources simultaneously . . .”). Hence, even though light signals travel very fast, the light signals must still first be transmitted “before” they can be detected. Accordingly, Appellant is not persuasive that Feldkhun fails to anticipate this limitation. We sustain the Examiner’s rejection of claim 4.

Claim 5

Claim 5 depends directly from claim 1 and adds the additional limitation “wherein no two light signals having a same one of the unique characteristic are en route . . . at the same time.” Regarding the requirement of the signals being unique, the Examiner references Feldkhun paragraph 45. *See* Final Act. 4. This paragraph 45, as indicated above, discusses providing illumination having “multiple patterns **206** having different spectra” so as “to produce first radiations **210** that may have different spectra.” Paragraph 46 of Feldkhun emphasizes the differences in the illumination by discussing the use of filters “in each channel to produce a first radiation with a spectrum that is distinct from other channels.” Hence, Appellant’s contention that the Examiner “has wholly failed to point to anything in

Feldkhun that expressly or necessarily describes” this limitation is without merit. Appeal Br. 13; *see also* Reply Br. 5.

Regarding the requirement of the signals being “en route . . . at the same time,” Appellant acknowledges that Feldkhun’s “simultaneous” transmission would suggest the signals are transmitted at the same time (and, as such, ‘en route’ at the same time).” Reply Br. 5. This is consistent with Feldkhun’s paragraph 79 which states that “the patterns may be projected sequentially and/or simultaneously.” *See* Ans. 8. However, despite such acknowledgement, Appellant contends that Feldkhun’s “simultaneous” transmission . . . is the complete opposite of the aforementioned limitations of claim 5.” Reply Br. 5. Appellant makes this statement, but it is not self-evident as to how Feldkhun’s disclosure of the simultaneous transmission of unique light signals fails to disclose the above limitation.

Accordingly, Appellant’s contentions that Feldkhun fails to teach the limitation “wherein no two light signals having a same one of the unique characteristic are en route . . . at the same time” is not persuasive. In other words, Appellant is not persuasive that the Examiner erred in relying on Feldkhun for teaching this limitation. We sustain the Examiner’s rejection of claim 5 as being anticipated by Feldkhun.

Thus, in view of the record presented, we sustain the Examiner’s rejection of claims 1, 2, 4–12, 14–16, 18–21, 23, and 24 as being anticipated by Feldkhun.

*The rejection of claims 13 and 22
as unpatentable over Feldkhun and Cable*

Claim 13 depends from claim 1 and further recites “a full reflector” and “a partial reflector, wherein the full reflector is moveable relative to the

partial reflector . . . and wherein varying the separation distance changes the unique characteristic.” The Examiner primarily relies on Feldkhun for such teachings (referencing Feldkhun’s disclosure of a tuneable light source), but acknowledges that Feldkhun “does not give details” as to how such tuning is accomplished. Final Act. 6. The Examiner relies on Cable as teaching “that a laser is tunable by means of moving [a] partial reflector” and provides a reason for their combination. Final Act. 6 (referencing Cable Fig. 6, ¶ 99); *see also* Ans. 12–13.

Appellant contends that the Examiner “seems to conflate the partial reflector with the ‘gain material’” and that the Examiner “has failed to make the rejection explicit.” Appeal Br. 22, 23; *see also* Reply Br. 7. To be clear, the Examiner is not equating Cable’s partial reflector with “gain material,” but instead is equating *the movement of* the reflectors with changes in gain. *See* Cable ¶ 99 (“the wavelength of tuned emission is proportional to the separation distance of the mirrors” and “the gain material **610** in this preferred embodiment is optically pumped”). In other words, Cable specifically teaches that an actuator “pulls the top mirror down, thereby reducing the cavity length and tuning a shorter wavelength of emission.” Cable ¶ 99.

In view of Cable’s disclosure of altering “gain material” by adjusting “the separation distance of the mirrors,” (Cable ¶ 99) Appellant’s contentions above regarding Examiner error by not making “the rejection explicit” is not persuasive. Appeal Br. 22.³ We sustain the Examiner’s rejection of claim 15 as being obvious in view of Feldkhun and Cable.

³ It may be that Appellant is seeking identical terminology in Cable and lacking same, contends that such components are not disclosed therein. *See*

Regarding claim 22, Appellant simply repeats the arguments discussed above regarding claim 13, i.e., the Examiner (a) “seems to conflate the partial reflector with the ‘gain material’” and (b) has failed to make the rejection explicit.” Appeal Br. 22–23. These arguments for claim 22 are not persuasive for similar reasons.

Accordingly, we sustain the Examiner’s rejection of claims 13 and 22 as being obvious over Feldkhun and Cable.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 4–12, 14–16, 18–21, 23, 24	102(a)(1)	Feldkhun	1, 2, 4–12, 14–16, 18–21, 23, 24	
13, 22	103	Feldkhun, Cable	13, 22	
Overall Outcome			1, 2, 4–16, 18–24	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Reply Br. 7 (“Indeed, Cable does not even mention the term ‘partial reflector.’”).